Copy 2

Occasional Paper No. 6 May 27, 1937

NORTHEASTERN FOREST EXPERIMENT STATION

C. Edward Behre, Director

New Haven, Conn.

REDUCTION OF NECTRIA CANKER IN HARDWOOD FORESTS OF THE NORTHEAST

By

Theodore J. Grant, Associate Pathologist, Division of Forest Pathology, Bureau of Plant Industry

Library
Northeastern Forest Experiment Station
Forest Service-U.S. Dept. of Agriculture

United States Department of Agriculture
NORTHEASTERN FOREST EXPERIMENT STATION 1/

REDUCTION OF NECTRIA CANKER IN HARDWOOD FORESTS OF THE NORTHEAST 2/

By

Theodore J. Grant, Associate Pathologist, Division of Forest Pathology, Bureau of Plant Industry.

The fundamental concepts and practical aspects which should govern reduction of Nectria canker in hardwood forests are summarized in the following statements.

I. Eradication of Nectria canker from forest stands is impractical, if not impossible.

II. Reduction of Nectria canker is possible, but is practical only when carried out as an integral part of stand improvement and other management operations.

III. The present and potential values of a stand should determine the amount of time, energy, and money spent for improvement work, which includes canker reduction.

IV. The importance of the Nectria canker is related not only to the value of the stand, but also to the objectives for which it is to be managed, as follows:

A. Game Conservation. - Nectria canker is of little or no importance. Cankers may help to produce old wolf trees, which may serve as a home for birds and small game.

B. Watershed Protection. - Nectria canker is of little importance. Actual killing of trees by canker is a slow process and does not usually result in abrupt or excessive openings in a stand. The openings which are made are usually filled by reproduction so that an adequate ground cover is maintained.

C. Recreation. - Nectria canker is of little importance. Cankered trees may serve as a source of fire wood. Cankered trees may be unsightly or may not live as long as healthy trees; thus they may be undesirable in some recreational areas.

1/ Maintained by the United States Department of Agriculture at New Haven, Connecticut, in cooperation with Yale University.

2/ Research supported in part by Emergency Conservation Work.

(Over)

D. Timber Production. - Nectria canker is at the present time one of the most widespread diseases of hardwoods. Its importance varies not only with its prevalence but also in relation to value of species attacked and uses for the stumpage. In northeastern forests Nectria cankers have been observed to occur most abundantly on exposed slopes, often at high elevations, and in stands which have been successively cut or burned. However, some cankered trees may also be found in good stands. Weed species, such as striped and mountain maples, pin cherry, and gray birch are often cankered, but these species are of little or no value for timber production. The valuable species most frequently observed cankered are the birches. Yellow and sweet birches are sometimes girdled and killed or poorly formed because of cankers. Paper and gray birches may also be heavily cankered. Red maple is widely distributed and frequently cankered. Sugar maple is frequently cankered but is rarely killed, and under good growth conditions is often not seriously injured. Oaks are not infrequently cankered, but they often have only a few cankers. Hickories, ashes, and black cherry may be cankered, but they have not yet been observed to be as frequently or as severely cankered as the birches or red maple. Cankered aspens are not uncommon. In some sections basswood is conspicuously cankered.

The losses concurrent with cankered trees depend in part on uses for the stumpage. In the manufacture of tool handles, toys, small dimension stock, paper, et cetera, bolts of short lengths are of value. It is apparent that in these cases the losses due to presence of cankers could often be limited to cull of the cankered areas. On the other hand, losses from Nectria canker are greater if the stumpage is to be used for saw logs. Losses from Nectria canker may be due to breakage in the crown or on the trunk at cankers. This breakage may result in either total loss of the individual tree or loss by reduction of annual increment. In addition to these apparent losses there is loss due to utilization of space in the stand that would be more profitable if supporting canker-free trees.

Variation in prevalence of Nectria-cankered trees and the variation in species attacked in different areas, plus differences in the relative value of species, make it desirable for the man in the field to observe distribution of diseased trees and to note the species attacked in each stand before carrying out improvement work. For purposes of discussion Nectria-cankered stands may be divided into three groups: (1) Stands with a high proportion of cankered trees; (2) stands with few to no cankered trees; and (3) stands with a moderate abundance of cankered trees.

1. Stands with a high proportion of cankered trees. - Fortunately many of the heavily cankered stands observed to date in New England have been located in areas which are not particularly well-suited for hardwood-timber production. Such areas may be characterized as being at high elevation, where trees are exposed to severe winter injury and where present growth conditions are not particularly good. These stands are of value as watershed protection, they afford refuge for game, and some could serve as recreational areas. Some of these

sites were previously covered with softwood, which was either cut off or damaged by fire. The soil conditions in these stands are now being effectively improved by the hardwood cover, and the presence of Nectria-cankered trees is not hindering this natural process of site improvement.

The future value of these stands varies. Some are so located that they may always best serve as areas for game or recreation, while others may eventually be of value for the production of softwood saw timber. Spaulding3/ has suggested that spot planting of softwoods (spruce, fir, and pine), together with release of any natural softwood reproduction for the purpose of getting properly spaced seed trees, is a possible and maybe a practical way of bringing these areas back into softwood saw log production. This process would necessarily have to be carried on slowly, but it appears to be sound from two standpoints. Economically one is not justified in making large expenditures of time and money on these now marginal stands, and spot planting and release of natural softwood reproduction are relatively inexpensive as compared with complete replanting. There is reason to believe that one could never hope to produce a good stand of Nectria canker-free hardwoods in these areas. Thus conversion of these stands with a high proportion of cankered trees into predominantly softwood stands seems desirable.

2. Stands with few to no cankered trees. - Such stands have most often been observed in areas where soil, atmospheric environment, and the density of stocking favor development of trees of good growth and form. In these stands the few cankered trees should be eliminated during stand improvement work unless there are strong silvicultural reasons for leaving certain individuals.

3. Stands with a moderate abundance of cankered trees. - It is the intermediate areas consisting of mixtures of good, fair, and poor sites and supporting a wide variety of tree species with a moderate abundance of cankered individuals, that present to the forester the most perplexing problems. However, when each stand is considered as a unit one may observe certain disease tendencies which should form a part of the basis for improvement work. A few questions, the answers to which should help formulate the basis for procedure, are herewith listed:

(A) What is the distribution of cankered trees in the stand? Are cankered individuals widely scattered over the entire stand, are they limited to one portion, or do they occur in scattered groups?

(B) What tree species is most frequently cankered?

(C) Are all trees of this species in the entire stand, or in local spots, cankered?

3/ Perley Spaulding. A suggested method of converting some heavily Nectria-cankered hardwood stands of northern New England to softwood. Manuscript to be submitted for publication in Journal of Forestry.

(D) On what portion of the tree are the cankers located? Are they only near the base of the trunk, or do they occur only in the branches or on both trunk and branches?

(E) Are the cankers open and active, or are they being callused over by the host?

(F) Do most trees have few or many cankers?

(G) Are there many dead cankered trees? What species?

Inspection of a stand may reveal answers to some of these questions, and in a large number of different areas a wide variety of answers would be obtained. However, general tendencies may also be noted and these are important. On the basis of general observations in stands with a moderate abundance of cankered trees one may expect to encounter:

(1.) Stands in which single cankered trees are widely scattered throughout. In these stands cankered trees should be utilized, felled, or girdled during stand improvement work. Occasionally a cankered tree may be left as a trainer, or for some other silvicultural reason, or because it has only one or a few unimportantly located cankers. In general, it is desirable to rid these stands of as many of the cankered trees as is practical.

(2.) Stands in which cankered trees are chiefly limited to one portion. This portion may be in a low area or on an exposed ridge which supports a tree population composed of several species. The individual trees usually vary in number and location of cankers. Treatment of these diseased portions of a stand would vary with existing conditions, but in general one may--

a. Plan eventually to change species composition in this portion of the stand favoring either softwoods or the most valuable hardwood species which shows least effect from Nectria infection.

b. Release healthy trees which have suitable form, vigor, and crown. When choice of trees to be left in the stand rests on cankered individuals, consider value of the species represented and the number and location of cankers present on each tree. Favor the best-formed and most valuable trees with the least canker damage.

c. Plan to utilize the cankered portion of the stand for other purposes than hardwood timber production when it covers a large area and is stocked with badly cankered, poorly formed, or undesirable species.

(3.) Stands with a scattering of single cankered trees and groups of cankered trees. In such stands the combined recommendations made in (1.) and (2.) would have to be modified to best fit the prevailing conditions. In general, such stands often contain valuable species which are lightly or not at all cankered and other species which are frequently cankered. In these stands favor the valuable species and trees with no or few cankers, and encourage these or softwoods, especially in the spots with groups of cankered trees.